

The modern long-chord cowling is designed in relation to the body behind it. Note in this view of one of Sabena's Savoia Marchettis how the cowling of the fuselage engine increases in diameter toward the rear and how that of the out-board units taper in the opposite sense. (*Flight* photograph.)

caused a spectacle not on the National Air Race placards.

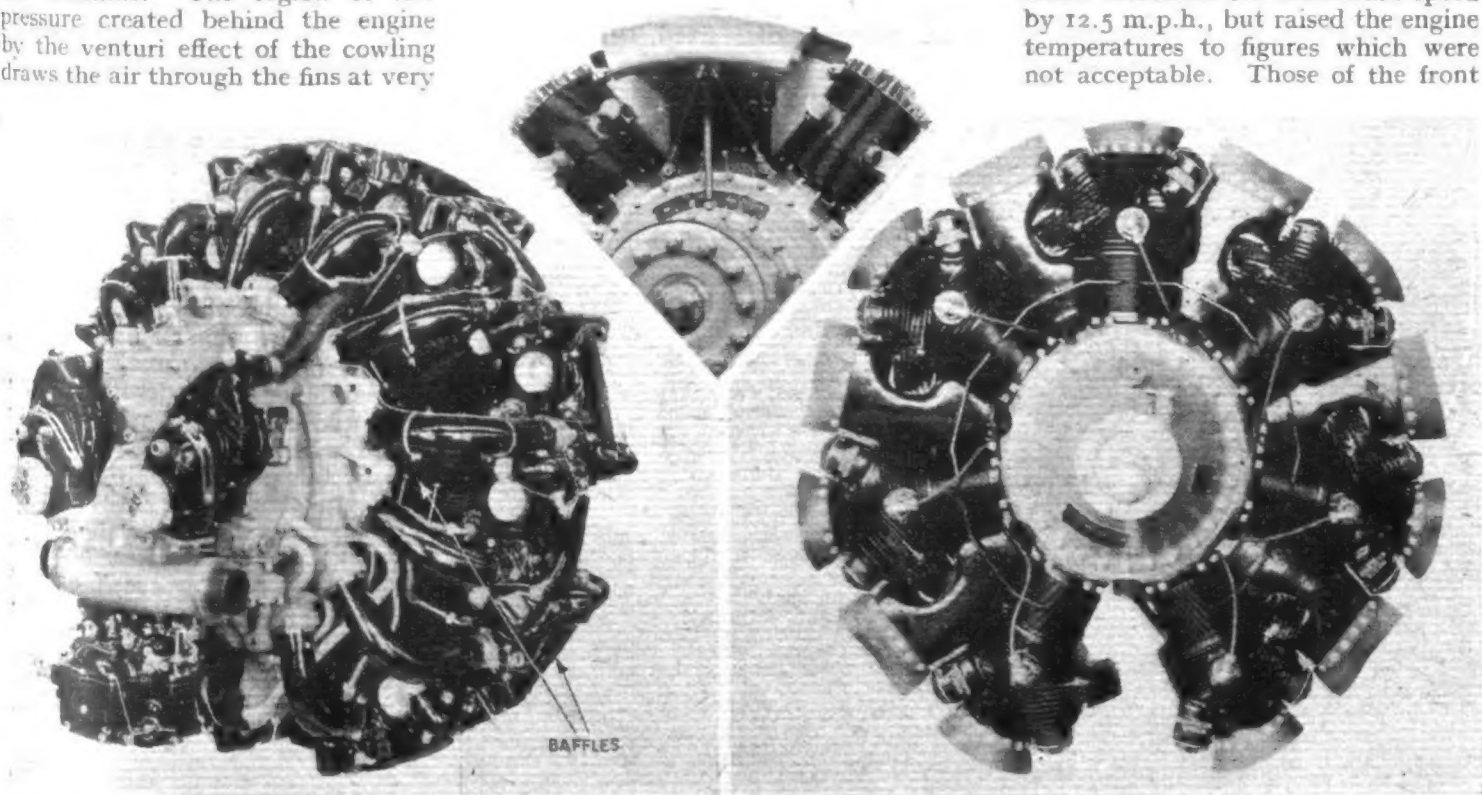
And what are the secrets of the very latest cowlings? How can they add many m.p.h. to the speed of a machine and yet cool a 1,000 h.p. geared and supercharged fourteen-cylinder two-row engine, with the massive hub and shanks of a variable-pitch airscrew blanking off most of the slipstream?

It is not possible, of course, to take just any radial engine, put in an N.A.C.A. cowling, fit it with baffles, and expect it to operate without overheating. The barrels and heads of the cylinders must have adequate fin area to cope with the high percentage of total power demanded continuously from the really modern closely cowled aero engines.

Baffles are provided to blank-off the free flow of air over the engine and to direct it so that the cylinders are cooled most effectively. These baffles on a normal single-row engine usually take the form, viewed from the front, of metal deflectors shaped to fit between, and to follow the contour of, the cylinders, and to extend partially round the rear of the cylinders in plan view. Appropriate spaces are left for the cooling air to escape out of the "gills" of the cowling: the space between the fins and the baffles is very small so that the air is forced to flow through the fins. Inter-rocker-box baffles are also in vogue, which means that the bulk of the air is built up in front of the engine by the airscrew and the forward speed of the machine. The region of low pressure created behind the engine by the venturi effect of the cowling draws the air through the fins at very

high speed. Engines with a complete baffling system closing off all the space under the cowling (except that which admits air to the fins) are said to have "pressure" baffles.

Naturally enough, the baffling of a two-row engine is comparatively difficult. At first it was not easy to supply the rear bank of cylinders with air which had not been heated through contact with those in the front row. It was, in fact, test flying with the original Pratt and Whitney Twin Wasp fourteen-cylinder engine in a Vought Corsair which gave rise to a large amount of experimental work with baffles and cowling. When this combination was flown with no ring cowling the cooling was quite satisfactory. The addition of a ring of narrow chord increased the maximum speed by 12.5 m.p.h., but raised the engine temperatures to figures which were not acceptable. Those of the front



In the top view may be seen the simple baffling possible through the clean design of a sleeve-valve engine (a Perseus); the left-hand view indicates the baffling arrangements on a fourteen-cylinder two-row Twin Wasp; and the third view shows the very latest Wright Whirlwind with its baffles (note the flexible junction pieces).